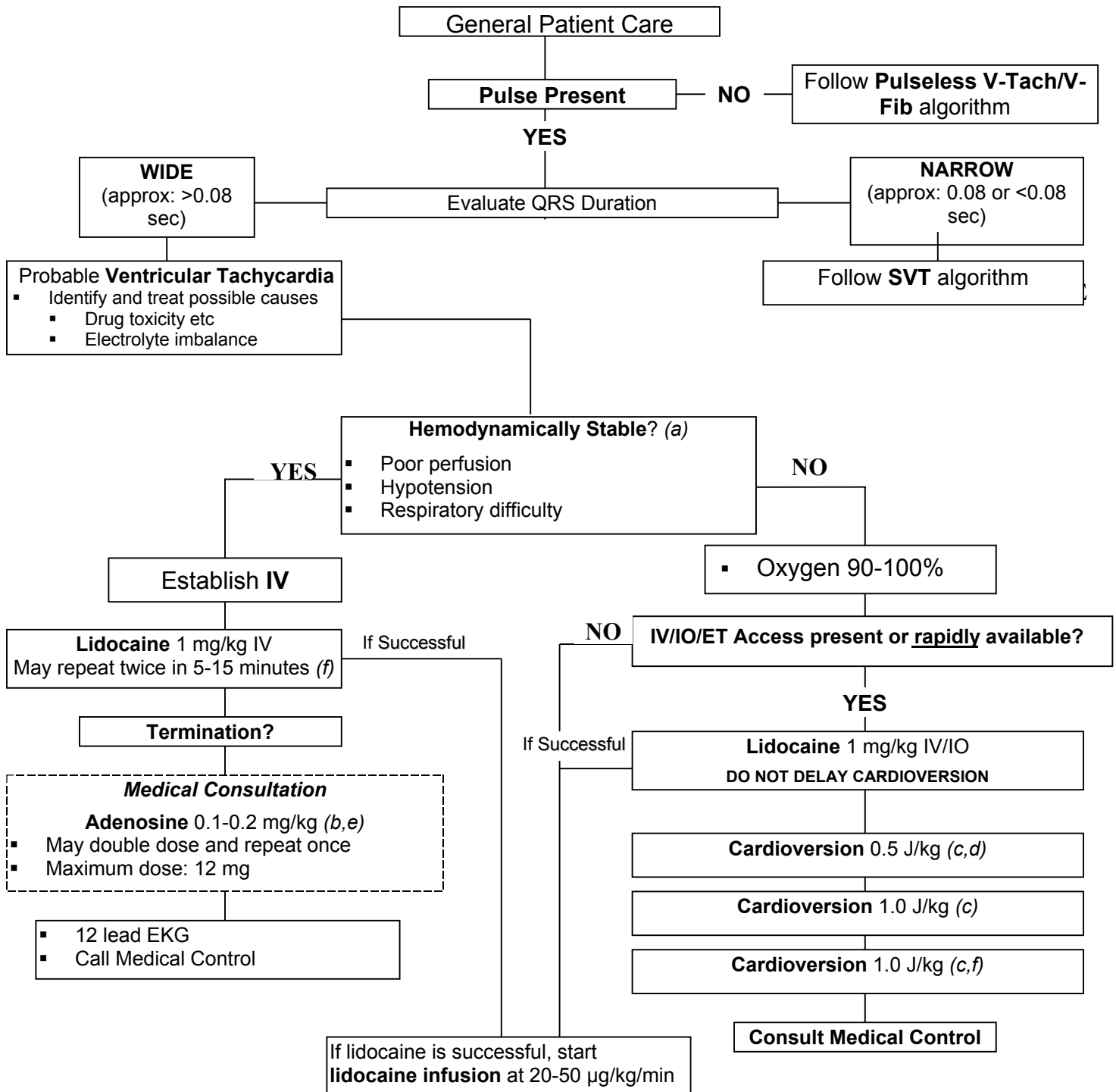




## ***Pediatric Ventricular Tachycardia Algorithm (VT)***



(a) Hemodynamically unstable: altered mental status with hypo-perfusion evidenced by delayed capillary refill, pallor, peripheral cyanosis, or hypotension. Respiratory compromised may also be present. Hypotension being defined as 70 plus twice the child's age in years or less  $[70 + (2 \times \text{years}) = \text{systolic BP}]$ .

(b) Be prepared for up to 40 seconds of transient asystole.

(c) If calculated joules setting is lower than cardioversion device is able to deliver, use the lowest possible setting.

(d) Evaluate vital signs and consider sedation (diazepam). **DO NOT DELAY CARDIOVERSION.**

(e) **RAPID INFUSION** (Follow adenosine infusion guidelines).

(f) **INITIATE TRANSPORT**



# ***Pediatric Cardiac Emergencies: Ventricular Tachycardia with a Pulse***



**Note Well:** *Cardiac dysrhythmias in otherwise healthy children are frequently the result of respiratory distress.*

## ***I. All Provider Levels***

1. Follow the General Patient Care guidelines in section A1.
2. If breathing is adequate, administer oxygen at 90-100% by face mask.
3. If airway cannot be maintained, begin ventilations with B-V-M and initiate advanced airway management using a combi-tube.



**Note Well:** *Do not use a combi-tube on a patient younger than 16 years of age or less than 5-feet tall.*



**Note Well:** *The EMT-I and EMT-P should use ET intubation.*

4. Assess Vital Signs.
5. Determine if the patient is hemodynamically unstable.



**Note Well:** *Hemodynamic instability is defined as "altered mental status with hypoperfusion evidenced by delayed capillary refill, pallor, peripheral cyanosis, or hypotension." Respiratory compromise may also be present. Hypotension is defined as a blood pressure of less than 70 plus twice the child's age in years.  
[70+(2 x Age)]=systolic BP*

- A. If signs and symptoms of hypotension are present, place the patient in a Trendelenburg position, unless pulmonary edema is present.



# ***Pediatric Cardiac Emergencies: Ventricular Tachycardia with a Pulse***

## ***I. All Providers (continued)***

6. Call for ALS support. Initiate care and do not delay transport waiting for an ALS unit.
7. Establish an IV of normal saline.



**Note Well:** *BLS Providers cannot start an IV on a patient less than eight years of age*



**Note Well:** *An ALS unit must be en route or on scene.*



**Note Well:** *If IV access cannot be readily established and the child is younger than 6 years of age then ALS Providers only may proceed with IO access. If the child is over 6 years of age, then contact Medical Control for IO access.*



## ***II. Advanced Life Support Providers***

1. Initiate cardiac monitoring.
2. Determine the length of the QRS complex.
  - A. If the QRS complex is wide (more than 0.08 sec) then treat as ventricular tachycardia.
  - B. If the QRS complex is narrow (0.08 sec or less than 0.08 sec) then treat as SVT (see Pediatric SVT protocol, Q4).
3. If the child is hemodynamically unstable then:
  - A. If IV/IO access is readily available, then administer lidocaine at 1mg/kg IV.
    - i. Repeat twice as necessary.



## ***Pediatric Cardiac Emergencies: Ventricular Tachycardia with a Pulse***

### ***II. Advanced Life Support Providers (continued)***

- ii. If lidocaine is successful in converting the rhythm, start an infusion at a rate of 20-50ug/kg/min.



**Note Well:** *Do Not Delay Cardioversion! If vascular access is not readily available, then administer synchronized cardioversion.*

- B. If lidocaine is unsuccessful or if IV/IO access is not readily available, perform synchronized cardioversion at 0.5 J/kg.
  - i. If the patient remains in ventricular tachycardia with a pulse, repeat cardioversion at 1 J/kg (maximum 360J).
  - ii. Cardioversion may be repeated a third time at 1 J/kg.



**Note Well:** *Do Not Delay Cardioversion! Contact Medical Control to consider sedating the patient before performing cardioversion by administering 0.2 mg/kg of diazepam IV (maximum single dose 5.0 mg)*



**Note Well:** *In the event of a provider induced diazepam overdose, administer 0.01 mg/kg of flumazenil IV/IO over 30 seconds. Repeat as needed every minute. Maximum single dose is 0.2mg and maximum total dose is 1mg. (Medical Control Option Only)*

**Caution:** *Flumazenil may induce seizures, particularly in patients with both tricyclic antidepressant overdose and benzodiazepine overdose.*

- 4. If the child is hemodynamically stable then:
  - A. Administer lidocaine at 1mg/kg IV
    - i. Repeat twice as necessary.
    - ii. If lidocaine is successful then start an infusion at a rate of 20-50ug/kg/min.



# ***Pediatric Cardiac Emergencies: Ventricular Tachycardia with a Pulse***

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## ***II. Advanced Life Support Providers (continued)***



- B. If the tachycardia continues, then consider termination of efforts and transport.
    - i. You may also call Medical Control and ask for permission to deliver adenosine at 0.1-0.2 mg/kg.
    - ii. When administering adenosine use a two-syringe technique with a rapid 5-10 cc flush immediately following medication administration.
    - iii. Be prepared for up to 40 seconds of transient asystole.
    - iv. You may double the dose and repeat once with a maximum single dose of 12 mg.
  - C. Follow up with a 12 lead EKG and call medical control for further direction. **DO NOT DELAY TRANSPORT!**
5. If the rhythm persists, consult medical control for further direction.



## ***III. Transport Decision***

- 1. Contact Medical Control for additional instructions.
- 2. Initiate transport to the nearest appropriate facility as soon as possible.
- 3. Perform a focused history and detailed physical examination en route to the hospital.
- 4. Reassess the patient at least every 3-5 minutes or as frequently as necessary and possible.



## ***Pediatric Cardiac Emergencies: Ventricular Tachycardia with a Pulse***

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### ***IV. The Following Options are Available by Medical Control Only***

1. Adenosine, 0.1-0.2mg/kg, initial dose to a maximum single dose of 6mg
2. Adenosine, 0.2-0.4mg/kg, second dose, to a maximum single dose of 12 mg
3. Diazepam, 0.2 mg/kg to a maximum single dose of 5.0 mg, IV only for sedation.
4. Flumazenil, 0.01 mg/kg to a maximum single dose of 0.2 mg and maximum total dose of 1mg to counteract provider induced diazepam overdose.
5. IO access for patients greater than 6 years of age.



***This protocol was developed and revised by Children's National Medical Center, Center for Prehospital Pediatrics, Division of Emergency Medicine and Trauma Services, Washington, D.C.***

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